



ETHNOMATHEMATICS EXPLORATION: NUMBER PATTERNS IN BAMBOO WOVEN CRAFTS IN TULUNGAGUNG

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Abstrak

Kerajinan anyaman jika dilihat dari wujudnya akan membentuk sebuah pola-pola yang teratur dan bahkan berulang, sehingga mengandung konsep matematika. Konsep matematika yang ada dalam kerajinan anyaman yaitu pola bilangan. Pola bilangan adalah suatu bilangan yang mempunyai aturan tertentu yang nantinya akan membentuk suatu barisan bilangan yang teratur. Penelitian ini bertujuan untuk mengetahui pola bilangan pada kerajinan anyaman di Kabupaten Tulungagung khususnya di Desa Sepatan Kabupaten Gondang. Penelitian ini menggunakan pendekatan kualitatif dengan jenis penelitian etnografi. Teknik pengumpulan data dalam penelitian ini adalah studi kepustakaan, observasi, wawancara, dokumentasi, dan catatan lapangan (field note). Hasil penelitian menunjukkan bahwa terdapat tiga pola bilangan pada proses pembuatan tampah. Pertama apabila proses pembuatan tampah dimulai dari K1 B1 pola bilangan yang terbentuk adalah 1-1-2-3-1-1-2-3. Kedua apabila proses pembuatan tampah dimulai dari K3 B2 pola yang terbentuk adalah 3-1-1-2-3-1-1-2. Ketiga apabila proses pembuatan tampah dimulai dari K1 B3 pola bilangan yang terbentuk adalah 2-3-1-1-2-3-1-1. Sedangkan pola bilangan yang terbentuk pada proses pembuatan besek ada tiga pola yang pertama apabila proses pembuatan dimulai dari K1 B1 pola yang terbentuk adalah 2-3-1-1-3-2-1-1-3-2-1-1-2-3-1-1. Kedua pola yang terbentuk apabila proses pembuatan dimulai dari K2 B5 adalah 3-2-2-4-3-2-4-2-2-3. Ketiga pola yang terbentuk apabila proses pembuatan dimulai dari K4 B8 adalah 1-1-3-1-2-3-1-1-2 dan seterusnya.

Kata kunci: anyaman bambu; eksplorasi; etnomatematika; pola bilangan.

Abstract

When viewed from its form, the woven craft will form a regular and even repetitive pattern, so it contains mathematical concepts. The mathematical concepts that exist in woven works are number patterns. A number pattern is a number that has specific rules that will form a regular sequence of numbers. This study aims to determine the pattern of numbers in woven crafts in Tulungagung Regency, especially in Sepatan Village, Gondang Regency. This study uses a qualitative approach to the type of ethnographic research. In this study, data collection techniques are the study of literature, observation, interviews, documentation, and field notes (field notes). The results showed that there were three patterns in the process of making a solid. First, if making an area starts from K1 B1, the number pattern formed is 1-1-2-3-1-1-2-3. Secondly, if the process of creating an appearance starts from K3 B2, the pattern formed is 3-1-1-2-3-1-1-2. Third, if making an area starts from K1 B3, the number pattern formed is 2-3-1-1-2-3-1-1. While the number of patterns formed in the making process based on three designs is the first, if the manufacturing process starts from K1 B1, the pattern formed is 2-3-1-1-3-2-1-1-3-2-1-1-2-3-1-1. The two models that are developed when the

manufacturing process begins from K2 B5 are 3-2-2-4-3-2-4-2-2-3. The three modes that are created when the manufacturing process starts from K4 B8 are 1-1-3-1-2-3-1-1-2. Secondly, if making an appearance starts from K3 B2, the pattern formed is 3-1-1-2-3-1-1-2. Third, if making an area starts from K1 B3, the number pattern formed is 2-3-1-1-2-3-1-1, etc.

Keywords: exploration; ethnomathematics; number pattern; woven bamboo.

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INTRODUCTION

Past objects, which are the work of humans, are called artifacts (Munandar, 2013). Artifacts are a form of culture in the form of the results of social work, activities, and actions in the community in the way of objects that can be seen, touched, or documented (Prabawati, 2016). Artifacts have an essential role because they contain information about aspects of cognition and human cultural behavior (Wattimena, 2016). Objects are visible artistic results where the context of the artifacts shows the diversity of human life at that time (EH Schein, 2010; Hiscock, 2007)

One type of craft that is included in the object is woven (Prabawati, 2016). Woven handicraft is one of the cultures that have existed since prehistoric times and is a cultural handicraft product created from a historical concept as outlined in the artwork (Rice, 2016). Webbing is used by the community to help meet the needs of daily life. Woven crafts continue to be produced by some people in Indonesia (Patria & Mutmainah, 2016; Prabawati, 2016). One of the cities that is still weaving is Tulungagung, especially in the village of Sepatan. Weaving activities are a legacy from generation to generation and are always being carried out to earn a living. Woven handicrafts also enrich the existence of crafts in Tulungagung, especially in Sepatan Village.

Weaving is a technique of connecting two or more objects or materials used to weave by crossing (overlapping) the lungs and feed so that they do not come apart. The woven material which is the basis of the woven media is called lungs, while the woven material used as created media by inserting it into the lungs that

are ready to be fabricated is called feed (Anandhita, 2017; Patria & Mutmainah, 2016; Suciati Rani & Purwokerto, 2019).

The materials used to make plaiting include bamboo, rattan, pandanus, palm leaves, sticks, dried roots. While the tools used for plaiting are still straightforward such as cutting blades and thinning knives (Patria & Mutmaniah, 2015; Septianawati & Puspita, 2016; Suciati Rani & Purwokerto, 2019), woven material that is often used in weaving is bamboo, or the village people call it spring. Bamboo or press is a kind of wild plant that grows around the garden. This research was conducted in Sepatan Village, Gondang District, Tulungagung Regency, where most of the residents of Sepatan Village made woven as their livelihood.

Woven craft, when viewed from its form, will form a regular and even repetitive pattern so that it contains mathematical concepts (Agung Hartoyo, 2012). In making woven crafts, bamboo or preg will overlap and cross each other in making it so that it will form an organized structure. In woven works, there are several patterns. Number pattern is a number with specific rules that will create a regular sequence of numbers (Asep Gilang Resfaty, Ipah Muzdalipah, 2019; Lowrie & Patahuddin, 2015).

Research on exploration in bamboo woven crafts has also been previously studied (Prabawati, 2016; Septianawati & Puspita, 2016; Suciati Rani & Purwokerto, 2019) where the three studies discuss building space contained in matting. (Asep Gilang Resfaty, Ipah Muzdalipah, 2019). Also researched ideas and geometric patterns on Mendong woven crafts in Manojaya, Tasikmalaya Regency. The object of the research was woven on eel and turban tops while in this study were woven and been woven.

Based on the background and previous research described above, researchers felt the need to research the title "Ethnomatematics Exploration: Numbers and Geometric Patterns in Bamboo Woven Crafts," as an individual study of ethnomathematics practiced by the people of Sepatan Village Gondang District Tulungagung District which has been done for generations. The problem in this study is how the number of patterns in bamboo woven crafts?. The purpose of this study is to reveal the pattern of numbers in bamboo woven crafts.

METHOD

This study uses a qualitative approach to ethnographic research. Data collection techniques used in this study are the study of literature, observation, interviews, documentation, and field notes. After the data is collected, the data is analyzed with several steps, namely reducing the data, presenting the data in a brief description or table, and drawing conclusions.

RESULTS AND DISCUSSION

Woven is usually made by the people of Sepatan Village, Gondang District, Tulungagung Regency, which is woven made from bamboo. Researchers try to describe mathematical ideas in woven crafts. This study's accurate opinions regarding the number of patterns found in woven handicrafts, especially tamp and back.

Woven bamboo handicrafts made by the people of Sepatan Village have various forms. The works are in the way of sheets or flat shapes (two dimensions), and there are shapes of space (three sizes). The structure of weaving objects made by the people of Sepatan Village is almost the same as the weaving craft made in other regions in general, maybe just a different name. The people of Sepatan Village still make the plait and use it as household utensils or furniture. Weaving objects are used by the people of Sepatan Village to make it easier to meet their daily needs.

1. Early Patterns of Handsome Manufacturing Process

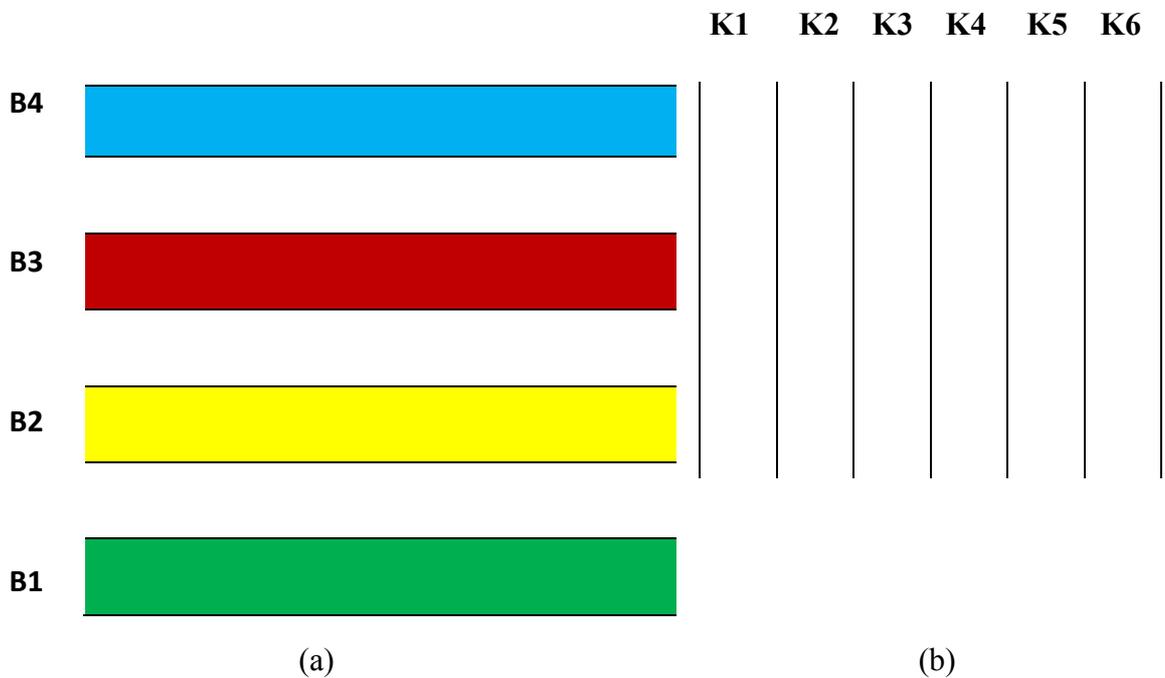


Figure 1. Initial Pattern

Figure (1a) is a vertically arranged slice which will be used as a basis in the process of making an image Figure (1b) is a slice that will be used to create a pattern by inserting it into a horizontally arranged stack that is the footing.

Pattern 1

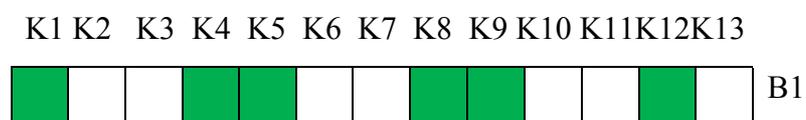


Figure 2. Pattern on B1

The first pattern used in the process of making the waste can be seen in the picture above. The first step is inserting the slices into K1 B1, after inserting the slices in K1 B1 then the slices are inserted under K2 B1 and K3 B1, then the installment is pulled up and occupy K4 B1 and K5 B1 and so on.

Pattern 2

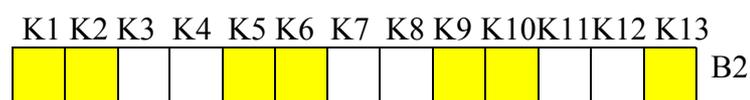


Figure 3. Pattern on B2

The second pattern that is used in the process of making solids can be seen in the picture above. The first step is to insert the slices into K1 B2 and K2 B2, the slices are added under K3 B2 and K4 B2. Then the incision is pulled up and occupies K5 B2 and K6 B2 and so on.

Pattern 3

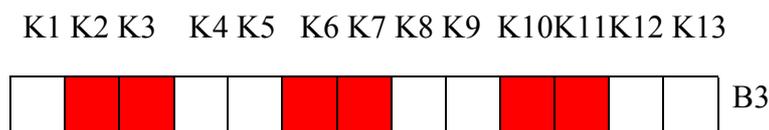


Figure 4. Patterns on B3

The third pattern that is used in the process of making solids can be seen in the picture above. The first step is to insert the slices into K2 B3 and K3 B3 directly, then the slices are added under K4 B3 and K5 B3. Then the incision is pulled up and occupies K6 B3 and K7 B3 and so on.

Pattern 4

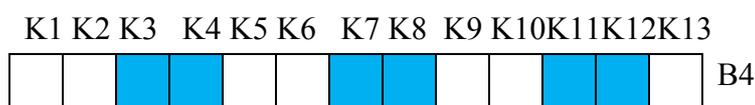


Figure 5. Pattern on B4

The fourth pattern that is used in the process of making the trash can be seen in the picture above. The first step is to insert the slices into K3 B4 and K4 B4 directly, then the slices are added under K5 B4 and K4 B6. Then the incision is pulled up and occupies K4 B7 and K4 B8 and so on. The pattern used when entering the strips into the steps is two columns.

2. Number Patterns on *Tampan*

Tampan is a tool made of bamboo in the shape of a circle with a diameter between 65-80 cm. Beautiful is usually used by the community for tape (separating rice and unhulled rice) and used to place cone and other dishes during traditional Javanese celebrations.

The Pattern That Is Formed In Handsome If The Work Process Begins With K3 B2

K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14 K15 K16 K17 K18 K19 K20 K21 K22 K23 K24 K25

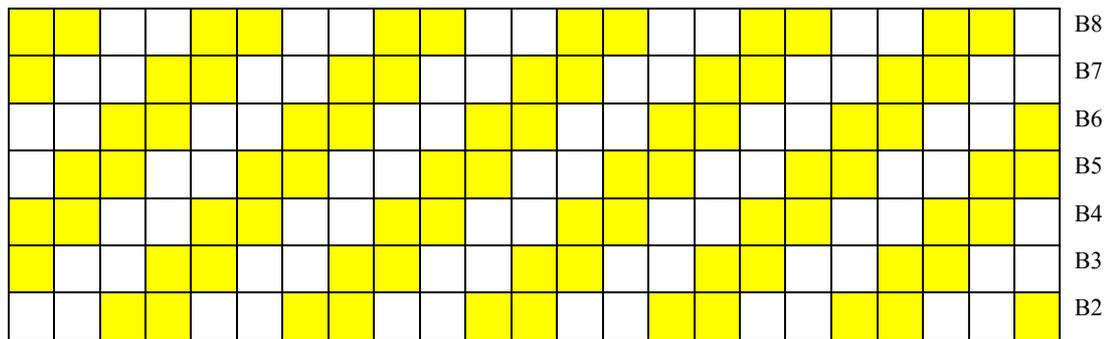


Figure 9 Patterns Formed on Hands Beginning with K3 B2

Researchers have analyzed the pattern of sequences found in the area. The model above is the basic pattern in making motifs on the surface. The line pattern that is formed when the process of making the waste begins at K3 B2 is 3-1-1-2-3-1-1-2.

The Pattern That Is Formed In Handsome If The Work Process Begins With K1 B3

K1 K2 K3 K4 K5 K6 K7 K8 K9 K10 K11 K12 K13 K14 K15K16K17 K18 K19K20K21K22K23 K24K25

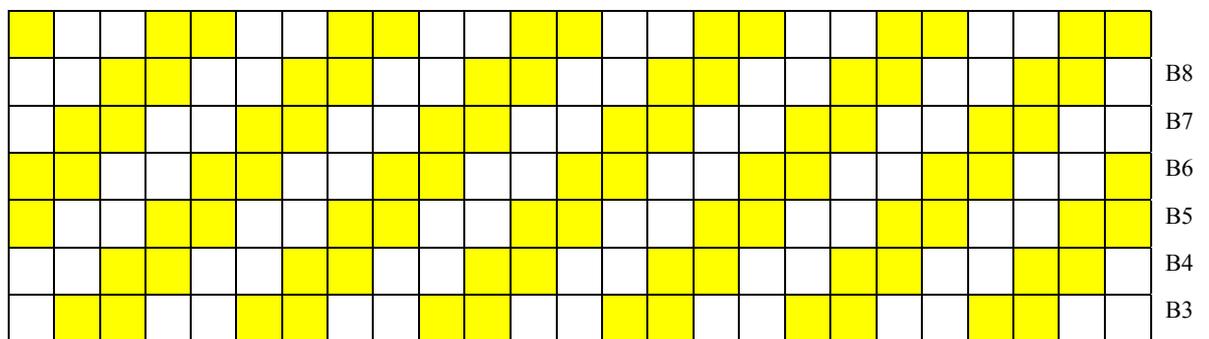


Figure 10. Patterns That Form on Hands If the Work Process Begins with K1 B2

Researchers have analyzed the pattern of sequences found in the area. The model above is the basic pattern in making motifs on the surface. The line pattern that is formed when the process of making the waste begins at K1 B3 is 2-3-1-1-2-3-1-1.

3. The Early Pattern of the *Besek* Making Process

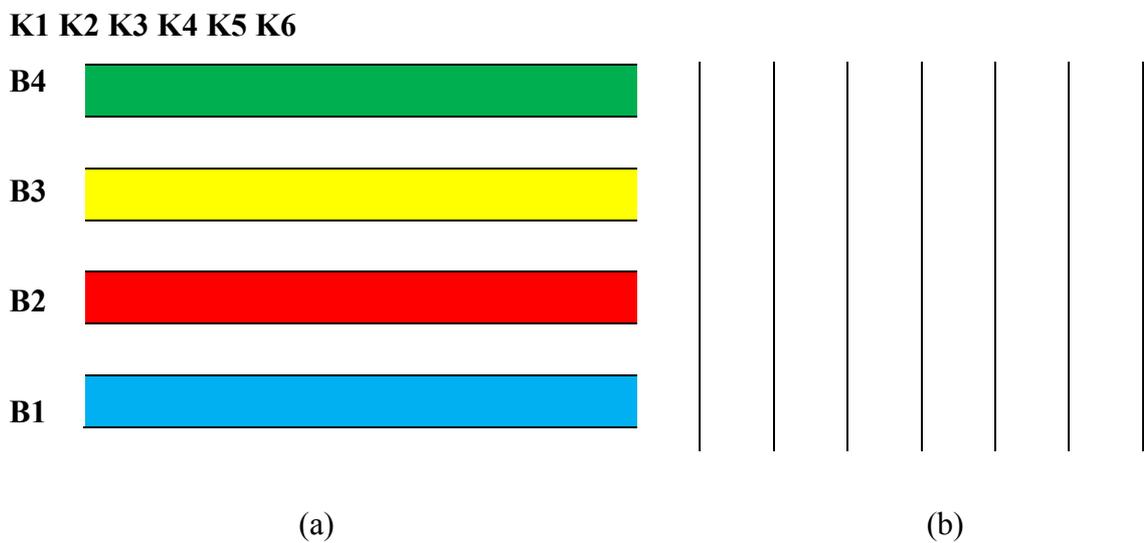


Figure 11. Pattern

Figure (11a) is a vertically arranged strip that will later be used as a basis for the process of making a solid

Figure (11b) is the strip that will later be used to make a pattern by inserting it into a horizontal piece used as a platform.

Pattern 1

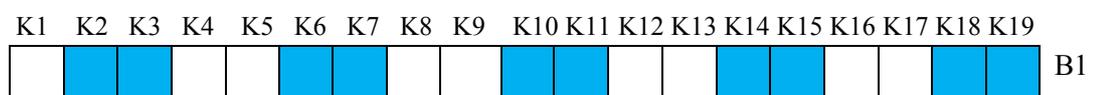


Figure 12. in B1

The original pattern used in the process of making baskets can be seen in the picture above. The first step is inserting the slices into K2 B1, this process is carried out from under K1, after adding the slices in K2 B1 and K3 B1 then the slab is inserted under K4 B1 and K5 B1, then the installment is pulled up and occupies K6 B1 and K7 B1.

Pattern 2

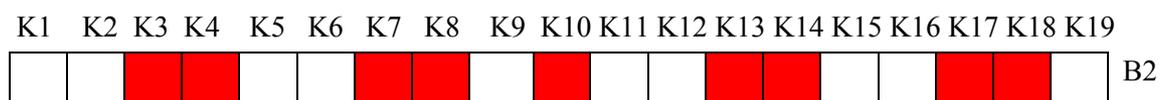


Figure 13. in B2

The second pattern used in the process of making baskets can be seen in the picture above. The first step is to enter the incision in K3 B2 and K4 B2. This process is done from under K1 B2 and K2 B2. The second stage introduces the incision in K3 B2 and K4 B2, the third stage enters the incision under K5 B2, and K6 B2, then the incision is pulled up and occupies K7 B2 and K8 B2. The fourth stage of the incision is inserted under K9 B2, then the incision is pulled up and occupies K10 B2 and so on.

Pattern 3



Figure 14. in B3

The third pattern used in the process of making baskets can be seen in the picture above. The first step is inserting the slices into K1 B3, after adding the slices in K1 B3, then the slices are added under K2 B3 and K3 B3. Then the incision is pulled up and occupies K4 B3 and K5 B3 and so on.

Pattern 4

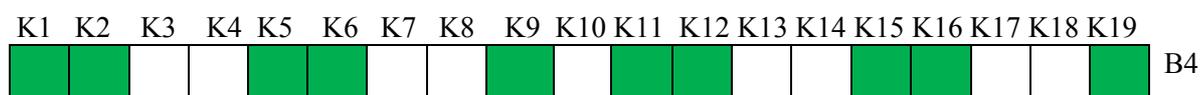


Figure 15. in B4

The fourth pattern used in the process of making baskets can be seen in the picture above. The first step is inserting the slices in K1 B4 and K2 B4, the second step after inserting the slices in K3 B2 and K4 B2 then the slice is inserted under K3 B4, and K4 B4 and the slice is pulled up to occupy K5 B4 and K6 B4. The third stage of the incision is added under K7 B4 and K8 B4, then the incision is pulled up and hold K9 B4 and so on.

4. Number Patterns on Besek

A tomorrow is a tool made from bamboo, which is square-shaped. The community uses baskets as a container to carry light goods. Besek is usually also used as a place for food.



Figure 16 *Besek*



Figure 17 Early *Besek* Pattern

a. The Pattern That Is Shaped On Hands If The Work Process Begins With K1 B1

K1	K2	K3	K4	K5	K6	K7	K8	K9	K10	K11	K12	K13	K14	K15	K16	K17	K18	K19	
Green	Green	White	White	Green	Green	White	White	Green	White	Green	Green	White	White	Green	Green	White	White	Green	B16
Green	White	White	Green	Green	White	White	B15												
White	White	Green	Green	White	White	Green	Green	White	Green	White	White	Green	Green	White	White	Green	Green	White	B14
White	Green	Green	White	White	Green	Green	B13												
Green	Green	White	White	Green	Green	White	White	Green	White	Green	Green	White	White	Green	Green	White	White	Green	B12

c. The Pattern That Is Formed On Handsome If The Work Process Begins With K4 B8

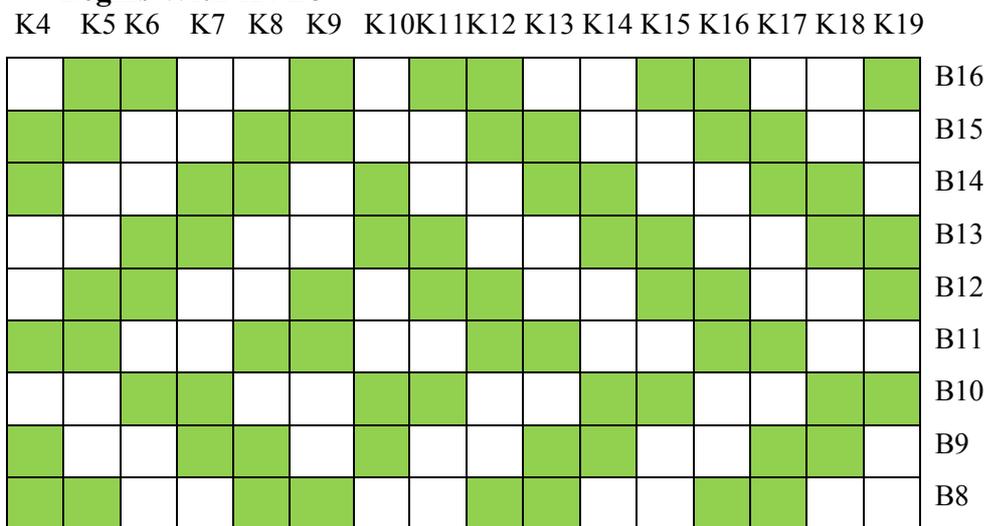


Figure 19. Number Patterns Starting at K4 B8

Researchers have analyzed the patterns contained in the besek motif, where the above model is a basic pattern for making motifs on the baskets with the following number patterns: 1-1-3-1-2-3-1-1-2.

CONCLUSION

In this study, the mathematical concepts that were successfully revealed were number patterns. These results indicate that there are four number patterns of the waste-making process. First, if the process of making an area starts from K1 B1, the number pattern formed is 1-1-2-3-1-1-2-3. Secondly, if the process of making an appearance starts from K3 B2, the pattern formed is 3-1-1-2-3-1-1-2. Third, if the process of creating an area starts from K1 B3, the number pattern formed is 2-3-1-1-2-3-1-1. While the number of patterns that are formed in the making process besek three models is the first if the manufacturing process starts from K1 B1, the pattern formed is 2-3-1-1-3-2-1-1-3-2-1-1-2 -3-1-1. The two trends that are created when the manufacturing process begins from K2 B5 are 3-2-2-4-3-2-4-2-2-3. The three models that are developed when the manufacturing process starts from K4 B8 are 1-1-3-1-2-3-1-1-2. This study can later be used as a basis for the development

of local culture-based mathematics learning materials so that it can dismiss the notion that mathematics has no connection with daily life.

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